Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Connect America Fund	)	WC Docket No. 10-90
	)	
Universal Service Reform – Mobility Fund	)	WT Docket No. 10-208
	)	

To: The Commission

PETITION FOR RECONSIDERATION

T-Mobile USA, Inc. ("T-Mobile")[1] hereby petitions the Commission to reconsider certain aspects of its *Mobility Fund Order*[2] in the above-captioned dockets.

I. INTRODUCTION AND SUMMARY

The Commission took important steps in the *Mobility Fund Order* in making Mobility Fund Phase II ("Phase II") a reality. Phase II will help ensure that robust, affordable voice and broadband service is available to consumers in all areas throughout the nation.

Having participated in Mobility Fund Phase I, T-Mobile has insight into the opportunities presented by Phase II and also the potential pitfalls associated with several aspects of the *Mobility Fund Order*. T-Mobile supports the Commission's efforts to establish definitive procedures and technical direction relating to Phase II performance requirements, which will help to ensure that participants have sufficient information about program obligations prior to the auction and to maximize competitive participation. Based on its experience as a winning bidder in Mobility Fund

[1] T-Mobile USA, Inc. is a wholly-owned subsidiary of T-Mobile US, Inc., a publicly traded company.

[2] *Connect America Fund; Universal Service Reform – Mobility Fund*, WC Docket No. 10-90; WT Docket No. 10-208, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 2152 (2017) ("*Mobility Fund Order*").

Phase I and results of internal analysis discussed herein, however, T-Mobile urges the Commission to reconsider the speed and latency thresholds adopted in the *Mobility Fund Order*, which are out of sync with the realities of providing mobile service in rural and hard-to-serve areas.[3] Specifically, the Commission should revise the speed requirement from 10 Mbps downlink throughput and 1 Mbps uplink throughput ("10/1") to a more prevalent threshold of 5/1, with at least 90 percent of the required measurements at 0.5 Mbps downlink and 0.15 Mbps uplink speed thresholds. The Commission also should revise the latency standard where 90% of measurements are equal or superior to 220 milliseconds ("ms").

In addition to these two technical changes, the Commission also should clarify and limit USAC's role in testing winning bidders' compliance with performance metrics and other public interest obligations. Specifically, the Commission should clarify two points: First, the Commission should reinforce the fact that winning bidders should have primary responsibility for compliance testing, and second, USAC's responsibilities for validation and auditing of winning bidders' submissions should be clearly defined and minimized to ensure a cost efficient process that avoids unnecessary, time-consuming duplication of effort.

Reconsideration of these aspects of the *Mobility Fund Order* will help bolster participation in the auction and ensure the successful implementation of Phase II.

II. THE SPEED THRESHOLDS SHOULD MATCH ACTUAL MOBILE SERVICE MEDIAN DATA SPEEDS

The adopted obligation to provide a median data speed of 10/1, with at least 90 percent of the required download speed measurements being not less than a certain threshold speed,[4] does not

[3] Application of speed and latency thresholds for Phase II should be limited to Phase II use and not applied more broadly. Any attempt to apply the limits more broadly would require a rulemaking proceeding.

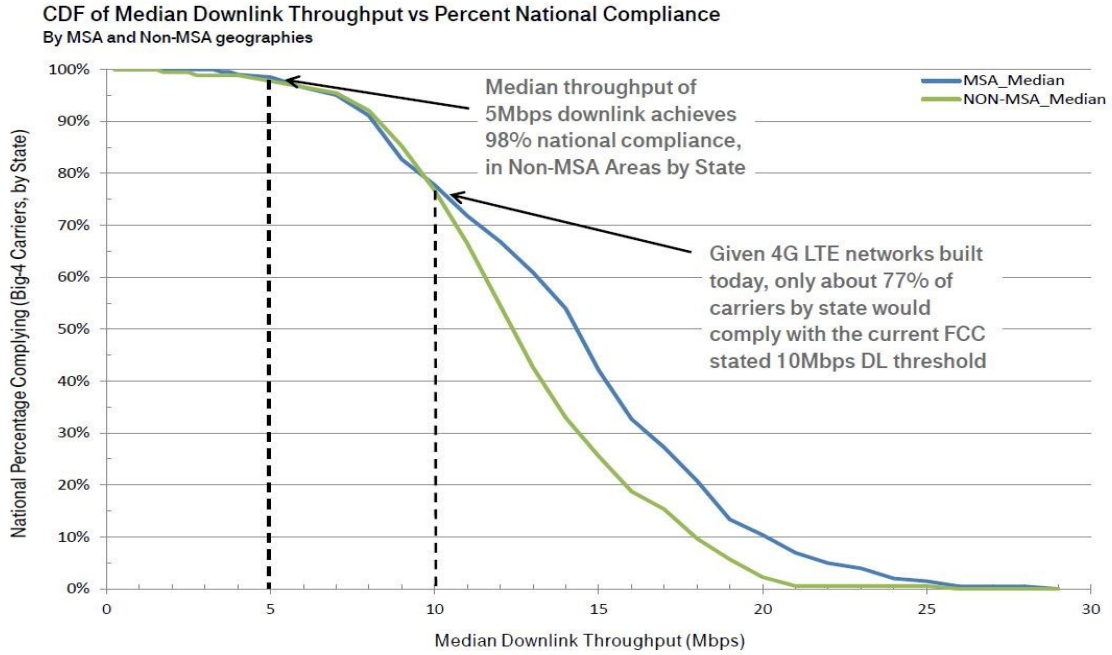
[4] *Mobility Fund Order*, 32 FCC Rcd at 2189 ¶ 87.

recognize the wide variation in delivering mobile LTE service across all geographies of the United States, both urban and rural.

Given the Commission's intention to ensure that "we do not relegate rural areas to substandard service that is not comparable to urban LTE service,"[5] it is important to recognize that wireless customers buying LTE service are not uniformly receiving 10/1 median data speeds today. T-Mobile analyzed Ookla Speedtest Intelligence data ("Ookla data") from January 2016 to the present for the four major national wireless carriers (T-Mobile, AT&T, Sprint, and Verizon Wireless). We segmented the data into cohorts by state, by carrier, and by Metropolitan Statistical Area (MSA and non-MSA), and created a cumulative distribution function ("CDF") of the cohorts that would pass a given speed requirement.[6] As the chart below demonstrates, only about 77 percent of both MSA and non-MSA cohorts achieved median speeds at or above the 10 Mbps download threshold adopted in the *Mobility Fund Order*.

[5] *Id.* at 2188 ¶ 86.

[6] To avoid problems resulting from small samples, we eliminated those cohorts with fewer than 130 results.



Source: Ookla Speedtest Intelligence Data (2016-2017); TMUS Analysis

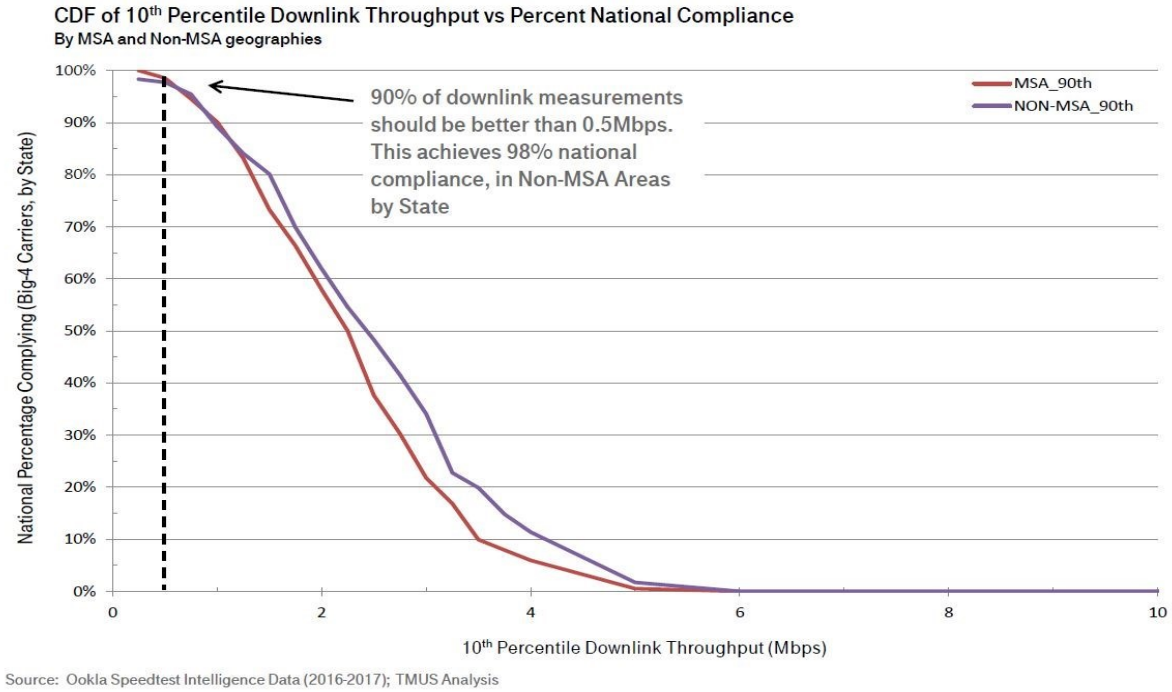
Given that carriers are not hitting a 10 Mbps download standard consistently nationwide, even in relatively urbanized areas, it would be overly burdensome to expect carriers to consistently meet such a standard in the rural and other hard-to-serve areas that will be included in Phase II. Mobile networks in rural areas are typically characterized by larger cell sizes than in denser areas, as well as greater diversity of terrain throughout each cell. These and other factors mean that network performance may vary more from location to location within each cell than it would in a smaller cell in a denser area. As a result, speed measurements near the cell edge or in areas of a cell that are affected by terrain or other obstructions are likely to be lower than near the tower. As a consequence of an overly aggressive 10 Mbps throughput requirement, bidders will be forced to "overdesign" their network for a given area, which will increase the bid prices per unit area, and the Commission's funding budget will yield significantly less new coverage than otherwise could be possible.

To approximate the speeds that consumers actually can expect nationwide, we reviewed the CDFs from the Ookla data for the threshold where 98 percent of the cohorts would meet the

criterion nationwide. Based on the Ookla data, we found that this standard is met at a 5 Mbps downlink throughput threshold, as demonstrated in the chart above. Thus, T-Mobile recommends that the Commission revise its downlink requirement to 5 Mbps.

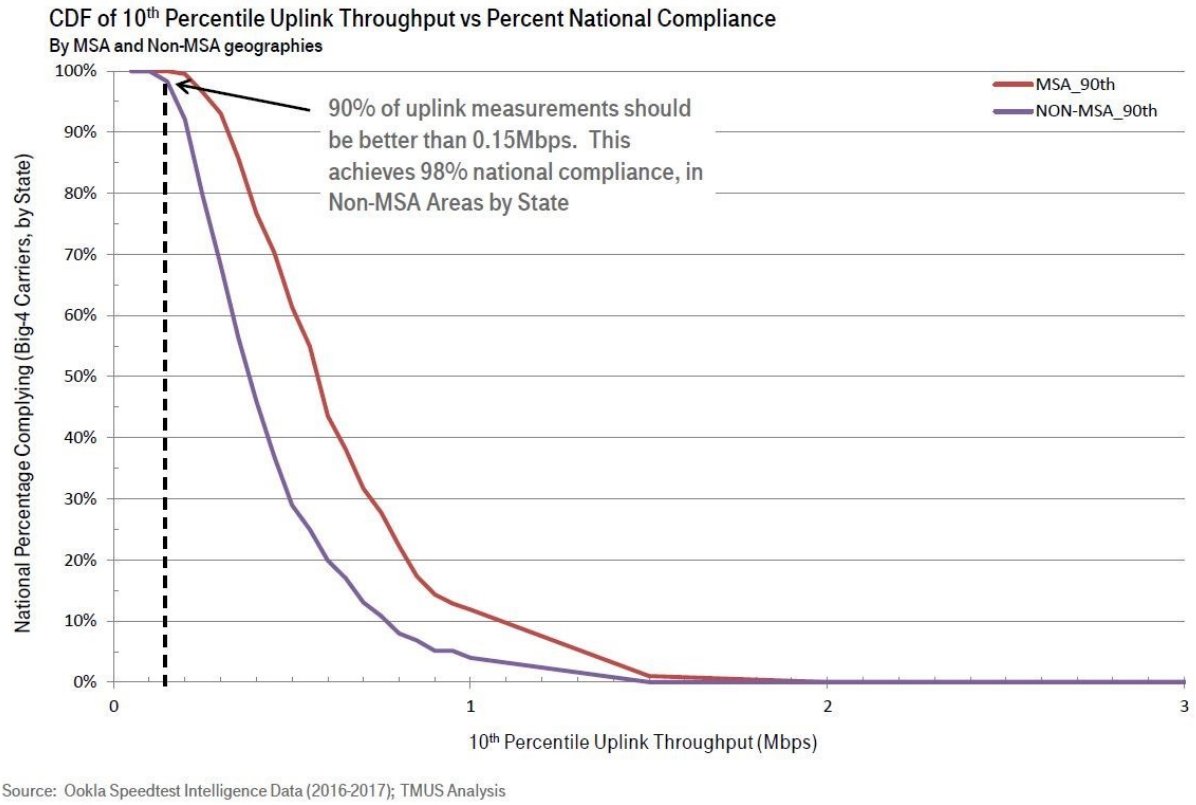
With regard to uplink speeds, the Ookla data show that no similar problems are presented by the Commission's 1 Mbps uplink throughput requirement. In fact, the data show that the median uplink throughput for 98 percent of the cohorts in non-MSA geographies is in excess of 1 Mbps.

The Commission's performance standard also includes a requirement that at least 90 percent of the required download speed measurements may not be less than a certain speed threshold to be determined. As shown in the chart below, the Ookla data reveals that the tenth percentile downlink throughput measurement is 0.5 Mbps.[7] Thus, the standard for at least 90 percent of the required download speed measurements should be 0.5 Mbps.



[7] This figure is based on non-MSA areas, which more closely approximate conditions in Phase II areas – although the figure for MSA areas is not significantly different.

The Commission's performance standard also includes a requirement that at least 90 percent of the required uplink speed measurements may not be less than a certain speed threshold to be determined. As shown in the chart below, the Ookla data reveals that the tenth percentile uplink throughput measurement is 0.15 Mbps.[8] Thus, the standard for at least 90 percent of the required uplink throughput measurements should be 0.15 Mbps.



Source: Ookla Speedtest Intelligence Data (2016-2017); TMUS Analysis

In sum, the Commission should reconsider its requirement that Phase II recipients build out to a 10/1 standard. Instead, the Commission should require 5/1 performance, with at least 90 percent of the measurements not less than 0.5 Mbps on the downlink and at least 90 percent of the measurements not less than 0.15 Mbps on the uplink.

[8] This figure is based on non-MSA areas, which more closely approximate conditions in Phase II areas – although the figure for MSA areas is not significantly different.

III. THE PHASE II LATENCY REQUIREMENT SHOULD BE CONSISTENT WITH THE ACTUAL PERFORMANCE OF MOBILE SERVICES

For similar reasons, the Commission should reconsider its latency requirement, which provides that "at least 90 percent of the required measurements must have a data latency of 100 ms or less round trip."[9] This standard appears to be based arbitrarily on the standard the Commission adopted for wireline broadband services, without accounting for the inherent differences associated with wireless technologies.[10]

As T-Mobile previously noted in this proceeding, bringing backhaul to cell sites designed to serve remote areas poses a significant challenge.[11] Industry standard options for delivering remote backhaul include microwave and satellite backhaul, both of which could introduce significant latency. Moreover, while emerging low earth orbit (LEO) satellites promise better latencies, the existing geosynchronous orbit (GEO) satellites are more reliable today but involve much higher latency.

The *Mobility Fund Order* fails to provide any basis for adopting a 100 ms latency threshold, and indeed notes that the record generally did not discuss the technical requirements of 4G LTE service.[12] The Commission's decision to establish a strict latency threshold at 100 ms for Phase II also is in marked contrast to its decision to adopt different latency performance levels for the CAF

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[9] *Mobility Fund Order*, 32 FCC Rcd at 2189 ¶ 87.

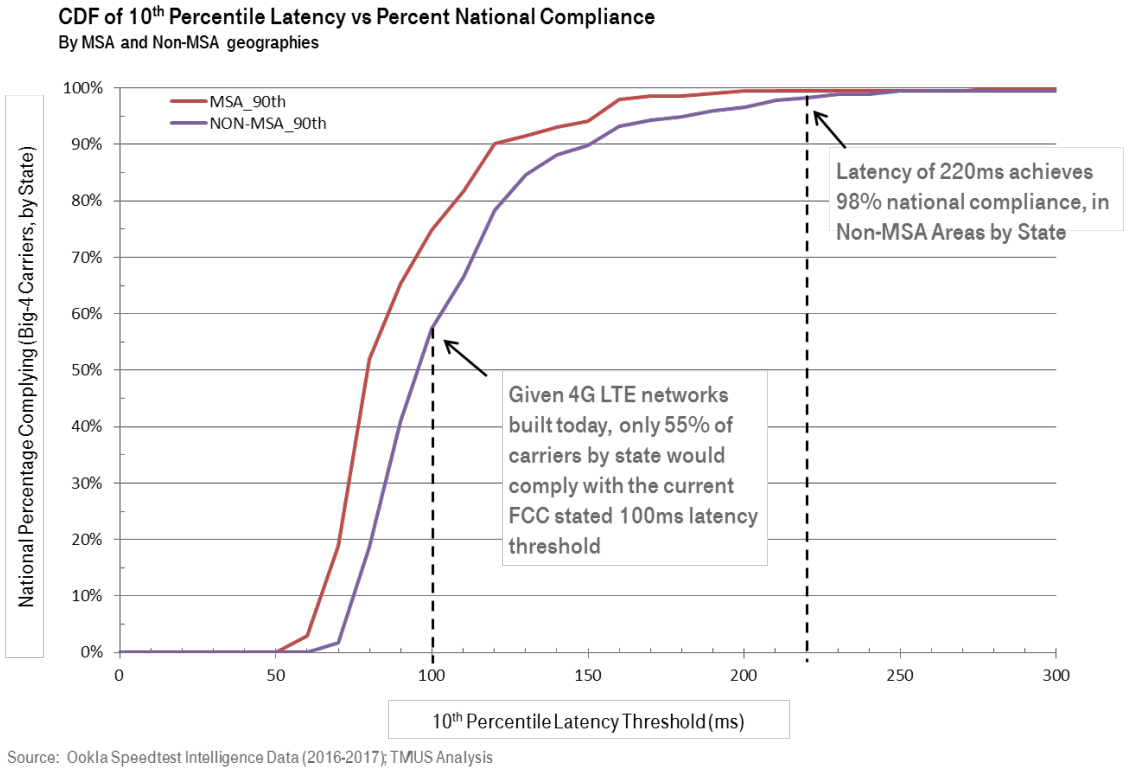
[10] *See, e.g.*, *Connect America Fund*, Report and Order, 28 FCC Rcd 15060, 15070 ¶¶ 22-23 (WCB 2013) (establishing the service obligations for price cap carriers that accept CAF Phase II model-based support); *Connect America Fund*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 5949, 5960 ¶¶ 28-29 (2016) ("*CAF Phase II Competitive Order*") (establishing latency performance levels for the performance tiers in the CAF Phase II competitive bidding process).

[11] Letter from Cathleen A. Massey and Indra Sehdev Chalk, T-Mobile, to Marlene H. Dortch, FCC, WT Docket No. 10-208, WC Docket No. 10-90, at 4 (Feb. 16, 2017). The *Mobility Fund Order* does not respond to T-Mobile's submission.

[12] *Mobility Fund Order*, 32 FCC Rcd at 2189 ¶ 87 n.220.

Phase II bidding process, where it recognized that, due to technological constraints, some providers (including those using GEO satellites) cannot meet a 100 ms latency standard.[13] There is no similar acknowledgement, much less discussion, of the technical characteristics of mobile services or how they affect latency for purposes of Phase II.

T-Mobile's analysis of Ookla data, depicted below, indicates that only 55 percent of existing 4G LTE networks would meet a 100 ms latency threshold today, whereas 98 percent could achieve a latency of 220 ms.



Source: Ookla Speedtest Intelligence Data (2016-2017); TMUS Analysis

Based on the data presented, a threshold no lower than 220 ms would be more appropriate and technologically realistic than the 100 ms threshold set by the Commission. T-Mobile's experience with USAC's verification of latency standards in Mobility Fund Phase I also emphasizes the need

[13] *CAF Phase II Competitive Order*, 31 FCC Rcd at 5960-61 ¶ 30.

for a realistic threshold. In Mobility Fund Phase I, USAC found that entire areas failed to meet the service requirements if even isolated measurements modestly exceeded the latency threshold – even if uplink and downlink speeds in the area were entirely consistent with the requirements. This created unnecessary burdens on the carrier, USAC, and the Commission – and ultimately could hurt consumers—who might lose service if the carrier loses support and therefore shifts facilities out of the area.

Carriers want to keep their customers happy, and, therefore, have every incentive to deliver the lowest latency achievable. They should not be penalized in Phase II for delivering bandwidth to remote areas using industry-standard solutions for backhaul service to these areas. Accordingly, rather than adopting an arbitrary latency threshold, the Commission should set a realistic threshold of 220 ms (for 90% of measurements) based on quantitatively observed data that is representative of the "on-the-ground" consumer experience.

IV. THE COMMISSION SHOULD MAKE CLEAR THAT WINNING BIDDERS RATHER THAN USAC WILL CONDUCT REQUIRED PERFORMANCE TESTS

The Commission should clarify USAC's role in testing compliance with Phase II performance obligations. The experience of Mobility Fund Phase I shows that the details of the compliance-testing process are critical and must be entirely clear to all stakeholders, particularly winning bidders and USAC. Those details may determine parties' willingness to participate in the program and thus must be defined in detail before the auction commences.

One aspect of the compliance-testing process in Mobility Fund Phase I included duplicative drive-testing by USAC vendors to validate participants' data. It is doubtful that the benefits of this duplicative testing outweighed the time and expense associated with conducting it.[14] The *Mobility*

[14] In T-Mobile's experience the burdens far outweighed the benefits: where USAC did duplicative drive testing to validate our data, they found that we had accurately reported having met passing metrics for 100% of the sampled data.

Fund Order and the Commission's rules appear to suggest that Phase II recipients will perform the required tests and report those results to USAC.[15] However, the FCC should explain and clarify if and how USAC will verify the data submitted by Phase II recipients, and make it clear that USAC should not routinely duplicate the drive-testing.[16] Defining proper parameters for USAC's validation and re-testing efforts will help ensure the administration of Phase II is effective and efficient, and would help companies properly formulate their buildout proposals and budgets.

V. CONCLUSION

For all of the reasons above, the Commission should (1) reconsider the speed thresholds and latency requirements associated with Phase II performance obligations so that they reflect the challenges of providing mobile service in rural areas and (2) clarify USAC's role in testing compliance with Phase II performance obligations.

Respectfully submitted,

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April 27, 2017

[15] *Mobility Fund Order*, 32 FCC Rcd at 2226-27 ¶¶ 196-99.

[16] Of course, duplicative drive testing may be appropriate if USAC detects problems with a verification or decides to check its veracity by conducting a spot audit.